WHAT IS CLAIMED IS:

1. A filter processing apparatus comprising:

a plurality of arithmetic units each of which comprises

multiplication means for multiplying input data by a predetermined coefficient,

addition means for adding a product of said multiplication means to a plurality of data including some of the input data, and

data storage means for generating data obtained by delaying the input data by a predetermined amount in accordance with a type of data, and

in that said plurality of arithmetic units are cascaded to execute a filter process for data inputted to the first stage of arithmetic unit.

2. A filter processing apparatus comprising:

a plurality of arithmetic units each of which comprises

multiplication means for multiplying input data by a predetermined coefficient, and

addition means for adding a product of said multiplication means to a plurality of data including some of the input data; and

storage means for storing data from the respective arithmetic units, and outputting delayed data of the stored data, and

in that said plurality of arithmetic units are cascaded to execute a filter process for data inputted to the first stage of arithmetic unit.

3. The apparatus according to claim 1, wherein each of said plurality of arithmetic units further comprises switching means for switching data to be input to the arithmetic unit, and the plurality of switching means are switched by an external control signal to switch a filter process between forward and inverse filter processes.

4. The apparatus according to claim 3, wherein the external control signal inverts a sign of the predetermined coefficient in accordance with switching of said switching means.

5. The apparatus according to claim 1, further comprising scaling means for executing a scaling process of a filter processing result of the arithmetic unit.

6. The apparatus according to claim 1, wherein the input data contain the externally input data, the sum obtained by said addition means, and the delayed data.

7. The apparatus according to claim 1, wherein the plurality of data further contain the externally input data and the delayed data.

8. The apparatus according to claim 1, wherein the data inputted to the first stage of arithmetic unit which constitute said cascaded arithmetic units is data that forms an image which is to undergo the forward filter process.

9. The apparatus according to claim 1, wherein the filter process includes discrete wavelet transformation.

10. The apparatus according to claim 9, wherein the filter process follows a method indicated by a lifting scheme.

11. The apparatus according to claim 1, wherein said predetermined coefficient is a multiplication coefficient in a lifting arithmetic operation.

12. A method of controlling a filter processing apparatus, comprising:

a method of controlling a plurality of arithmetic units, which comprises

the multiplication step of multiplying input data by a predetermined coefficient,

the addition step of adding a product of the multiplication step to a plurality of data including some of the input data, and

the data storage step of generating data obtained by delaying the input data by a predetermined amount in accordance with a type of data, and

in that a filter process is executed for data inputted to the first stage of arithmetic unit using said control method for cascading and operating the plurality of arithmetic units.

13. A method of controlling a filter processing apparatus, comprising:

a method of controlling a plurality of arithmetic units, which comprises

the multiplication step of multiplying input data by a predetermined coefficient, and

the addition step of adding a product of the multiplication step to a plurality of data including some of the input data; and

the storage step of storing data from the respective arithmetic units in storage means, and outputting delayed data of the stored data from the storage means, and

in that a filter process is executed for externally input data.

14. The method according to claim 12, further comprising the switching step of switching data to be input to the arithmetic unit, and in that the plurality of the switching steps are switched by a control mode signal to switch a filter process between forward and inverse filter processes.

15. The method according to claim 12, further comprising the scaling step of executing a scaling process of a filter processing result of the arithmetic unit.

16. A storage medium that stores a program code which makes a computer, that loads said program code, function as a filter processing apparatus, comprising:

a program code which serves as an arithmetic unit and comprises

a program code of the multiplication step of multiplying input data by a predetermined coefficient,

a program code of the addition step of adding a product of the multiplication step to a plurality of data including some of the input data, and

a program code of the data storage step of outputting, from predetermined storage means, data obtained by delaying the input data by a predetermined amount in accordance with a type of data, and

in that a filter process is executed for externally input data using said program code serving as the arithmetic unit a plurality of number of times.

17. A storage medium that stores a program code which makes a computer, that loads said program code, function as a filter processing apparatus, comprising:

a program code which serves as an arithmetic unit and comprises

a program code of the multiplication step of multiplying input data by a predetermined coefficient, and

a program code of the addition step of adding a product of the multiplication step to a plurality of data including some of the input data; and

a program code of the storage step of storing data inputted from the respective arithmetic units, and outputting delayed data of the stored data from storage means, and

in that a filter process is executed for externally input data.

18. A filter processing apparatus having a multilayered structure that includes:

an uppermost arithmetic layer comprising a plurality of arithmetic units each of which receives

three data corresponding to pixel data which are to undergo a filter process, and computes output data; and

a plurality of intermediate arithmetic layers each comprising the plurality of arithmetic units each of which receives three inputs including two output data computed by the layer immediately above the intermediate arithmetic layer of interest, and one data obtained by the layer two layers above the intermediate arithmetic layer of interest, and computes output data,

wherein each of the plurality of arithmetic units comprises one of:

a first arithmetic unit having a first arithmetic mode for computing output data using three input data; and

a second arithmetic unit which can switch between the first arithmetic mode, and a second arithmetic mode for computing output data for three data on the basis of two out of three input data, and

the arithmetic mode of the second arithmetic unit is switched to the second arithmetic mode when data which is to undergo the filter process is input at a timing near a boundary of an image.

19. The apparatus according to claim 18, further comprising switching means for reversing an order of a data sequence to be supplied to said uppermost arithmetic layer.

20. The apparatus according to claim 19, wherein said switching means switches at a timing before a processing timing of a boundary trailing end.

21. The apparatus according to claim 18, wherein the first and second arithmetic units have buffer memories for storing input data so as to supply the stored data to the lower layers.

22. The apparatus according to claim 18, wherein wavelet transformation or inverse wavelet transformation is done.

23. The apparatus according to claim 18, further comprising a third arithmetic unit having two different second arithmetic modes.

24. A method of controlling a filter processing apparatus having a multilayered structure that includes:

an uppermost arithmetic layer comprising a plurality of arithmetic units each of which receives three data corresponding to pixel data which are to undergo a filter process, and computes output data; and

a plurality of intermediate arithmetic layers each comprising the plurality of arithmetic units each

of which receives three inputs including two output data computed by the layer immediately above the intermediate arithmetic layer of interest, and one data obtained by the layer two layers above the intermediate arithmetic layer of interest, and computes output data,

wherein each of the plurality of arithmetic units comprises one of:

a first arithmetic unit having a first arithmetic mode for computing output data using three input data; and

a second arithmetic unit which can switch between the first arithmetic mode, and a second arithmetic mode for computing output data for three data on the basis of two out of three input data, and

said method comprises the step of switching the arithmetic mode of the second arithmetic unit to the second arithmetic mode when data which is to undergo the filter process is input at a timing near a boundary of an image.

25. A filter processing apparatus for processing data, comprising:

a plurality of arithmetic units each having holding means for holding data, a plurality of adders, subtractors, or adders/subtractors, and a multiplier or a position converter, and

in that said plurality of arithmetic units form a cascade connection of n units, and compute two different wavelet transform coefficients using input data of 2n+1 taps and 2n-1 taps.

26. The apparatus according to claim 25, wherein each of said plurality of arithmetic units has two adders, subtractors, or adders/subtractors before and after the holding means to be able to add or subtract an output from the multiplier or the position converter to or from one or both of input and output data of the holding means.

27. The apparatus according to claim 26, wherein each of said plurality of arithmetic units has two position converters equivalent to the position converter to switch two different digit positions in accordance with a required arithmetic operation.

28. The apparatus according to claim 25, wherein each of said plurality of arithmetic units adds output data from the holding means to one of input data to the arithmetic unit, and has a plurality of position converters equivalent to the position converter to switch two different digit positions in accordance with a required arithmetic operation.

29. The apparatus according to claim 27, wherein each of said plurality of arithmetic units has offset generation means for inputting an offset to the adders or subtractors, and round processing means for executing round processing of output data from the arithmetic unit arranged between the arithmetic units.

30. The apparatus according to claim 28, wherein each of the offset generation means and the round processing means has first and second mask means for masking data, and the first and second mask means are controlled to be exclusively validated.

31. The apparatus according to claim 25, wherein each of said plurality of arithmetic units has at least two holding means equivalent to the holding means, and computes by alternately inputting data for two lines to the two holding means.

32. A method of controlling a filter processing apparatus for processing data, comprising:

the input step of inputting data to a head arithmetic unit of an arithmetic unit group formed by cascading n arithmetic units each of which has holding means for holding data, a plurality of adders, subtractors, or adders/subtractors, and a multiplier or a position converter; and

the control step of controlling the arithmetic unit group to compute two different wavelet transform coefficients using input data of 2n+1 taps and 2n-1 taps.

33. A filter processing method for processing data, comprising:

the input step of inputting data;

the first generation step of generating intermediate data as data generated during an arithmetic operation of lattice point data on a lifting lattice structure on the basis of the data inputted in the input step;

the holding step of holding the intermediate data generated in the first generation step in a storage medium; and

the second generation step of generating the lattice point data using the intermediate data held in the holding step.

34. A storage medium that stores a program code for controlling a filter apparatus for processing data, comprising:

a program code of the input step of inputting data to a head arithmetic unit of an arithmetic unit group formed by cascading n arithmetic units each of which has holding means for holding data, a plurality

of adders, subtractors, or adders/subtractors, and a multiplier or a position converter; and

a program code of the control step of controlling the arithmetic unit group to compute two different wavelet transform coefficients using input data of 2n+1 taps and 2n-1 taps.

35. A storage medium that stores a program code of a filter process for processing data, comprising:

a program code of the input step of inputting data;

a program code of the first generation step of generating intermediate data as data generated during an arithmetic operation of lattice point data on a lifting lattice structure on the basis of the data inputted in the input step;

a program code of the holding step of holding the intermediate data generated in the first generation step in a storage medium; and

a program code of the second generation step of generating the lattice point data using the intermediate data held in the holding step.